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ABSTRACT

The study described here is an attempt to answer the question: does the classroom ratio of non-white to white pupils influence the quality of the behavior of the participants in integrated classrooms? And, if so, is there an optimum ratio of classroom racial composition? To carry out such an investigation, an instrument designed to provide a quantified criterion of school district quality, "Indicators of Quality," was used. It is based upon forty key concepts of classroom behavior categorized under four headings: individualization, interpersonal regard, group activity, and creativity. The study used data from over 18,000 observations taken from 164 of the 224 districts that have employed this instrument--60 districts having no classrooms containing non-white pupils. The major finding of the study was that the percentage of non-white pupil classroom composition does have influence on classroom behavior. If the concept of racial balance is to include the criterion of the quality of classroom behavior, then the findings of this study are held to strongly suggest that two factors should be considered: the percentage of non-white pupil classroom composition, and the proportion of non-white pupils in the school. The most desirable racial balance with respect to the criterion of quality classroom behavior was found to be in classrooms of 21-40 and 41-60 percent non-white pupil composition. (Author/RJ)

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SPECIAL REPORT

The Influence Of Non-White Pupil Classroom Composition On Classroom Quality

James H. Frenk

Though the integration of schools and classrooms has been an issue of great importance over the last twenty years, little has been resolved by the intense debate it has generated. Support for the integrated setting is wide spread, but those favoring it are hard pressed to cite convincing evidence of its advantages. Often, and much to their discredit, arguments offered on its behalf are shallow and indefinite. For example, a number of studies examine the influence of the integrated classroom on student achievement, but the specific proportion of non-white pupils varies from one study to the next, making comparisons difficult if not invalid. No studies have examined the influence on classroom quality of one specific ratio of racial composition as compared to another. Those supporting the integration of schools and classrooms do not wish to obfuscate the facts; they simply do not have at their disposal research which has dealt with the finer points of the issue.

The question of what classroom ratio of non-white to white pupils is optimal may well be the key around which all other questions pertaining to the integrated classroom revolve. And yet, most discussion devoted to answering this question fails to be very specific. The frequent use of the term "racial balance" to designate a desirable ratio of non-white to white pupils illustrates the level of ambiguity surrounding the issue. Lip service is given to the desirability of "racial balance" but few statements can be found suggesting what specific ratios of non-white to white pupils are meant by the term. Some have attempted to define the term as meaning wide ranges of racial composition covering intervals somewhat below 50 percent non-white pupils. Definitions such as these have often been developed by a deductive approach relying on the fields of psychology, anthropology, and sociology for premises or generalizations about how non-whites and whites will behave when mixed in the classroom. They were not based upon research which has directly tested the influence of specific ratios of racial composition on key classroom variables against various criteria of classroom quality. One cannot fault such efforts, those responsible did the best they could; research of this type simply has not been done.

It is no wonder that the debate over the integrated classroom carries on now as intensely as it did twenty years ago. Though there are indications that advantages exist for both black and white pupils in the integrated classroom, the evidence available thus far has failed to impress the white majority. If the public is ever to assume a stance in favor of integrated schools (and classrooms) which heretofore it has adopted, with few exceptions, only under intense legal pressure, then the claims for integrated classrooms must be supported by far more convincing research findings. The study described here is an attempt to fill this void by dealing directly with the question, does the classroom ratio of non-white to white pupils influence the quality of the behavior of the participants? And, if so, is there an optimum ratio of classroom racial composition.

METHOD

To carry out such an investigation it was necessary to devise a means for comparing various levels of racial composition with respect to some criterion of classroom quality. And, in the interest of making the study as valuable as possible conditions were sought which would provide for the examination of the influence of racial composition under as many different classroom circumstances as possible. **Indicators of Quality** satistied these criteria extremely well.

Indicators of Quality is an instrument designed to provide a quantified criterion of school district quality. It is based upon *forty key concepts* of classroom behavior categorized under four headings:

1. Individualization
2. Interpersonal Regard
3. Group Activity
4. Creativity

An assessment of the classroom behavior of a school district is carried out by professional educators in a uniform manner. The basic unit of analysis is a 20 minute timed sample of classroom behavior. Trained observers devote 5 minute segments of attention to teacher behavior, pupil behavior, the interaction between the two, and the review and completion of the score sheet in each class observed. During these time periods they record, when observed, *51 specified behaviors: 17 teacher, 17 pupil, and 17 teacher/pupil interactions.* These behaviors are considered to be evidence of the *forty key concepts* and are critical to the process of quality education. It is the *obvious presence* of these behaviors in either negative or positive form which observers record. When combined for all observers, these recorded "signs" generate a score which is a measure of quality for a district. School district applications of the instrument are carried out and in turn scored on the basis of grade bands K-2, 3-6, 7-9, and or 10-12. For each of these bands a stratified random sample of observation time periods are drawn from schools within a school district.

The sample of districts drawn together by the application of **Indicators of Quality** is not random in any sense of the term. Most of the districts which used the instrument were members of one of the study councils of the Institute of Administrative Research, at the time they applied it. They were districts with a strong interest in educational research and quality educational performance. Though many districts express this concern, those who have applied the instrument demonstrate a unique willingness to exhaust their resources of time, effort, and money for the information it can supply. This study used data from over 18,000 observations taken from 164 of the 224 districts that have employed the instrument; 60 districts having no classrooms containing non-white pupils. Though a few of the districts are rural and some urban, the sample is for the most part suburban.[1]

ABOUT THE AUTHOR: James H. Frenk held an OEO Research Trainee at the Institute of Administrative Research and received an Ed.D. from Teachers College, Columbia University. He holds an administrative position with the Public School System of Elgin, Illinois.

1. For a more detailed description see: James H. Frenck, "An Investigation of the Influence of Non-White Pupil Classroom Composition on Classroom Quality in Relation to a School System Criterion Measure" (Unpublished Ed.D. dissertation, Teachers College, Columbia University, New York, 1973).

During each observation the observer records various characteristics of the classroom setting including:

- number of students
- grade level
- sex of the teacher
- subject taught
- style of educational activity
- number of non-white pupils present

Since it is suspected that the strength of the influence of *racial composition* on *classroom quality* is a function of the proportion of non-white pupils, it was necessary to devise a scheme which would make it possible to carry out a comparison of various ratios. In an attempt to establish a consistent and regular basis for examination which — recognizing the percentage levels thought to be critical by others and at the same time respecting the limitations of the data at hand — 20 percent intervals were selected extending across the entire range of possible ratios: 0-20 percent, 21-40 percent, 41-60 percent, 61-80 percent, and 81-100 percent.

The primary dependent variable for the study is the "mean difference score." It is defined as the arithmetic average of the difference between the positive and negative scores. For each of the behaviors to which the observer gives his attention; *teacher, pupil,* and *the interaction between the two;* a *mean difference score* is generated. For descriptive purposes, these scores were designated as *"teacher," "pupil,"* and *"teacher/pupil,"* scores in this study. The composite of these is the *"mean difference score."*

As a means to reduce the breadth of the independent variable and to divide it into meaningful components, grade level was controlled for bands 3-6 and 10-12 and class size was controlled for sizes 16-25 and 26-35. Four potential intervening variables were also employed:

1. type of school
2. sex of teacher
3. subject taught
4. style of educational activity.

All of these variables tested the strength of the relationship between the independent and dependent variables.

The typology of school requires further explanation. It is based upon the degree of concentration of non-white pupils in each of the schools in the participating 164 districts.[2] The schools were typed by identifying the two adjacent intervals of non-white pupil composition among 0-20 percent, 21-40 percent, 41-60 percent, 61-80 percent, and 81-100 percent having the highest number of observations. This approach discriminated among schools because the lowest level for any one school combining the two intervals having the highest concentration of observations was 50 percent. However, this system did not alone exhaust all of the schools in the sample. Some schools had all of their observations in one interval. Others spread all of their observations evenly or summetrically over 3 adjacent intervals. All but 10 of the 1440 schools of the entire sample were identified by one of these methods. Those 10 were assigned arbitrarily after inspection to one of the above configurations which seemed most appropriate. This method resulted in 18 different configurations of intervals which were combined into 6 types of school composition of non-white to white pupils. They were:

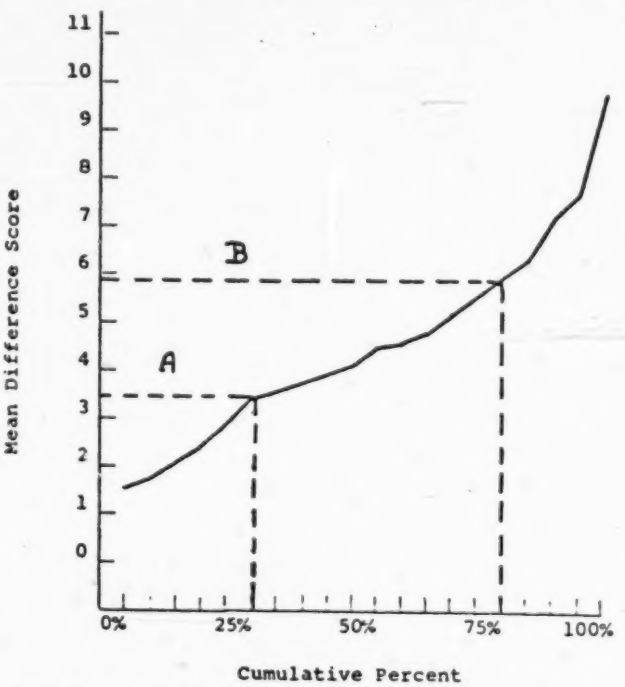
- Concentrated White
- Mixed White
- Mixed
- Mixed Non-White
- Concentrated Non-white
- Spread

It is also necessary to point out that the variables *subject taught* and *style of educational activity* are controlled for those subjects which have consistently generated higher scores in earlier studies based upon **Indicators of Quality.**[3]

In an attempt to expand the explanation of the meaning of the relationship between the independent and dependent variables an elaboration process, **survey analysis,** was carried out. **Survey analysis** is the analytical approach used to describe the extent of the influence of the independent variable, and the other component and potential intervening variables, upon the dependent variable. It is particularly well suited for a study utilizing the descriptive method of inquiry because it employs data directly from the natural setting without exerting artificial or contrived controls. The component and potential intervening variables are test factors which can serve to specify the relationship with respect to the circumstances found in the classrooms of the sample. Initially, the dependent variable is distributed across the 20 percent intervals of the independent variable. Beginning with this straight tabulation, the other variables are introduced and the independent and dependent variables are stratified by the component categories of these test variables. This process of cross tabulation is carried out for each component and potential intervening variable independently of the others and then in combination with the others in a step-wide fashion until the independent and dependent variables are stratified by all of the variables simultaneously. Results of these cross tabulations for each combination of variables are described by the dependent variables *mean difference scores, teacher scores, pupil scores, and teacher/pupil scores; the percentage of observations for the categories of variables;* and the *number of observations.* Comparisons of score levels are made based upon their relative position on cumulative percentile curves derived from the mean difference scores of the 99 schools of the sample having 30 or more observations.

Figure I

Cumulative percent curve of the Mean Difference Scores of 99 schools of the sample having 30 or more observations showing interval score differences.



RESULTS

For the entire sample of 18,164 classroom observations of class size 16-35 and grade levels 3-6 and 10-12 the mean difference score was 5.35. Controlling classroom composition for the proportion of non-white pupils by 20 percent intervals revealed a pattern (shown in Table I) which was repeated in

2. For a more detailed description see: James H. Frenck, "An Investigation of the Influence of Non-White Pupil Classroom Composition on Classroom Quality in Relation to a School System Criterion Measure" (Unpublished Ed.D. dissertation, Teachers College, Columbia University, New York, 1973).

3. Martin N. Olson, "Identifying Predictors of Institutional Quality: An Examination of Eleven Internal Classroom Variables in Relation to a School Criterion Measure" (Unpublished Ed.D. dissertation, Teachers College, Columbia University, New York, 1970).

Table 1

INDICATORS OF QUALITY MEAN DIFFERENCE SCORES FOR 20% INTERVALS OF NON-WHITE PUPIL CLASSROOM COMPOSITION

	0-20%	21-40%	41-60%	61-80%	81-100%	Overall
Scores	5.38	5.09	5.86	3.44	4.98	5.35
N	16,180	1,071	304	138	471	18,164

other later states of analysis as other test factors were controlled. The magnitude of the difference between the low score at the 61-80 percent interval and the high score at the 41-60 percent interval can be illustrated by the use of a cumulative percent curve. Figure 1 traces the mean difference scores for the 99 schools of the sample having 30 or more observations. Line A, representing the mean difference score for the 61-80 percent non-white interval, reveals that its score of 3.44 had a percentile rank of 30. Whereas, line B, representing the mean difference score of 5.86 for the 41-60 percent interval, traces out a percentile rank of 80; a total percentile rank difference of 50.

The mean difference score for the entire sample of 5.35 was composed of a teacher score of 2.54, a pupil score of 1.22, and a teacher/pupil score of 1.58. The pattern of scores found in the straight tabulation of the mean difference scores were closely paralleled in the three component scores as displayed in Table 2.

Table 2

INDICATORS OF QUALITY TEACHER SCORES, PUPIL SCORES, AND TEACHER/PUPIL SCORES FOR 20% INTERVALS OF NON-WHITE PUPIL CLASSROOM COMPOSITION

	0-20%	21-40%	41-60%	61-80%	81-100%	Overall
T Scores	2.54	2.48	2.99	2.19	2.53	2.54
P Scores	1.24	1.21	1.10	0.35	1.11	1.22
T/P Scores	1.60	1.40	1.76	0.90	1.35	1.58
MD Scores	5.38	5.09	5.86*	3.44	4.98*	5.35*

*Error due to rounding

Teacher behavior contributed more to the mean difference score than either pupil or teacher/pupil behavior. Moreover, with respect to the overall relationship among scores, it appeared that though the teacher scores are influenced as well as the others, they held up better at the lowest scoring 61-80 percent interval.

With one exception, when the variables of the study were cross-tabulated the variations of scores across the intervals of the independent variable compared to the pattern found in the original straight tabulation were negligiable. *Grade level* showed generally higher scores for grades 3-6. *Class size* revealed generally higher scores for smaller classes. Controlling for both at the same time, the original pattern of scores was maintained with elementary, small classes having the highest scores with an overall of 6.16; elementary, large classes next with an overall score of 5.60; secondary, small classes below all elementary with an overall score of 4.46; and secondary, large classes lowest with an overall score of 3.75. *Teacher sex* failed to exert any influence on the relationship between independent and dependent variables. And, controlling by *grade level*, *class size*, and *teacher sex* simultaneously produced score patterns across the 20 percent intervals that matched closely those of the original straight tabulation.

The variable school typology was the exception to the above. Distributing the sample of classroom observations by school typology alone yielded scores that varied distinctly among the school types. As Table III shows, the scores range

Table III

INDICATORS OF QUALITY MEAN DIFFERENCE SCORES FOR SIX TYPES OF SCHOOLS OF NON-WHITE PUPIL COMPOSITION

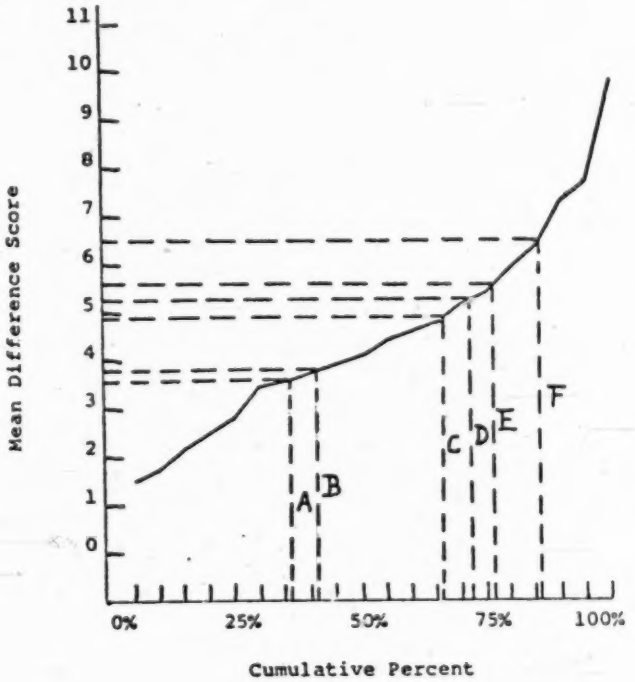
School Type	Scores	N of Observations
Concentrated White	5.34	16,063
Mixed White	6.46	301
Mixed	3.57	74
Mixed Non-white	4.96	100
Concentrated Non-white	5.71	320
Spread	3.74	197
Overall	5.34	18,091

from a low of 3.57 to a high of 6.46; a difference of 2.89. This difference is even larger than those found across the intervals of the percentage of non-white pupils of the original straight tabulation.

The magnitude of these differences is described in Figure 2. It can be seen that three of the school types had a

Figure 2

Cumulative percent curve of the Mean Difference Scores of 99 schools of the sample having 30 or more observations showing school type scores.



percentile rank difference of no more than 12. **Mixed White**, **Concentrated Non-white**, and **Concentrated White** scored at or above the overall mean difference score for the total sample. Those falling below the overall mean difference score, **Mixed Non-white**, **Spread**, and **Mixed** were spread further apart. **Mixed**, with a mean difference score of 3.57, had a percentile rank 50 below that of **Mixed White**. For every school type, pupil scores accounted for the smallest portion of the mean difference score. Teacher scores contributed the most; on the average just less than one-half. As Table IV illustrates, the very low mean difference scores

Table IV

INDICATORS OF QUALITY TEACHER SCORES, PUPIL SCORES AND TEACHER/PUPIL SCORES FOR SIX TYPES OF SCHOOLS OF NON-WHITE PUPIL COMPOSITION

School Type	T Scores	%	P Scores	%	T/P Scores	%	MD Scores	%
Concentrated White	2.53	47	1.23	22	1.59	30	5.34	99*
Mixed White	3.16	48	1.57	24	1.73	27	6.46	99*
Mixed	2.30	84	0.31	9	0.96	27	3.57	100
Mixed Non-white	2.40	48	1.00	20	1.56	31	4.96	100
Concentrated Non-white	2.74	48	1.36	24	1.60	28	5.71	100
Spread	2.17	58	0.63	17	0.93	25	3.74	100
Overall	2.54	48	1.22	23	1.58	29	5.34	100

*Error due to rounding

for the two lowest scoring schools were a result of lower pupil scores; although all three scores were lower. On the other hand, the three highest scoring school types had matching contributions from teacher, pupil, and teacher/pupil scores.

When the sample was cross tabulated for school typology and 20 percent intervals of non-white pupil classroom composition, as shown in Table 5, the pattern of scores previously found across the original straight tabulation did not appear in any school type.

Table V

INDICATORS OF QUALITY MEAN DIFFERENCE SCORES FOR 20% INTERVALS OF NON-WHITE PUPIL CLASSROOM COMPOSITION BY SIX TYPES OF NON-WHITE PUPIL COMPOSITION SCHOOLS

	0-20%	21-40%	41-60%	61-80%	81-100%	Overall
Concentrated White						
Scores	5.38	4.89	5.36	3.47	3.35	5.34
N	16,068	859	117	38	17	17,099
Mixed White						
Scores	7.12	6.43	6.57	4.67	5.50	6.46
N	14	163	113	9	2	301
Mixed						
Scores	3.67	4.59	5.00	—1.11	7.11	3.57
N	6	17	24	18	9	74
Mixed Non-white						
Scores	6.25	6.42	6.00	3.79	2.60	4.96
N	4	12	37	42	5	100
Concentrated Non-white						
Scores	3.75	4.14	5.20	5.82	5.71	
N	4	7	25	284	320	
Spread						
Scores	4.80	1.25	6.67	5.17	3.62	3.74
N	20	12	6	6	153	197
Overall						
Scores	5.38	5.10	5.86	3.44	5.00	5.34
N	16,112	1,067	304	138	470	18,091

The **Concentrated White** type approximated the pattern for intervals covering 0-80 percent, but because there are too few observations in the 81-100 percent interval a complete comparison could not be made. It is the 81-100 percent interval in the **Concentrated Non-white** type which clearly accounted for the high score at this level. In fact, it was higher than any interval score of the **Concentrated White** school type. However, the highest mean difference scores were found within the **Mixed White** school type at the 21-40 percent and 41-60 percent intervals. Their respective scores of 6.43 and 6.57 were responsible for the 6.46 overall mean difference score for this school type; the highest of all types. It should also be noted that **Mixed Non-white**, had the third highest 20 percent interval mean difference score among all school types with a score of 6.00 in its 41-60 percent interval. Among all school types the 41-60 percent interval of non-white pupil composition consistently had higher scores. And, with the exception of the **Concentrated Non-white** school type, the 61-80 percent interval had lower scores.

Pupil scores contributed the least in almost every 20 percent interval in every school type. Moreover, they tended to be more responsible for low scoring intervals than either of the other component scores. On the other hand, school types with mean difference scores above the total sample mean difference score were high due to proportionate increases in all three component scores.

Controlled independently the variables class size, grade level, and teacher sex provided no dramatic departure from previous findings. However, having controlled for grade level it was now impossible to carry out an analysis any further for grade level 10-12. Controlling both by 20 percent intervals of non-white pupil classroom composition and school typology spread the sample of classroom observations so thin that there were not enough observations upon which to make valid comparisons for grade level 10-12. Consequently, from this point forward, analysis was limited to grades 3-6. Since there were so few secondary observations spread among the school types, controlling for grade level yielded only a slight change in score levels. In fact, the very same pattern of scores was found, though it was now slightly higher for each interval. And, elimination of the secondary observations caused only the slightest variation in scores when controlling for *teacher sex*. Moreover, controlling for *elementary grade level, class size, and teacher sex* simultaneously yielded no unexpected results in light of the previous findings.

Mixed White school type had the highest scores for the entire distribution for female teachers in large classes at the 21-40 percent interval and small classes at the 41-60 percent interval.

In small classes at the 21-40 percent interval and large classes at the 41-60 percent interval female teachers had scores slightly above the overall mean difference score for the entire distribution of observations but which fall well below the high scoring intervals of the **Concentrated Non-white** and **Concentrated White** school types. The second highest scoring school type was **Concentrated Non-white** at the 81-100 percent interval for female teachers in large classes. **Concentrated White** had the third highest scores in the 0-20 percent interval. Both female and male teachers in this type had precisely the same score in small classes at this interval. Female teachers scored slightly lower in the 21-40 percent interval in small classes, but for this same interval female teachers in large classes and male teachers in both small and large classes scored very low.

What is said for high scoring subjects can be echoed for high scoring styles of educational activity. When controlled neither variable influenced the pattern of scores differently from that found across the five 20 percent intervals of the original straight tabulation. But even though the pattern was the same these variables did intervene to produce much higher scores with larger differences between them. Of even

greater significance was the finding that the independent variable did not exert an influence on the amount of usage of both variables. The proportion of use per 20 percent interval of the observations of the high scoring sample matched closely the proportion of the total sample of observations. In other words, pupils in classes of any one of the 20 percent intervals of non-white pupils composition had as much exposure to high scoring subjects and styles of educational activity as those in any others.

DISCUSSION

The major finding of this study was that the *percentage of non-white pupil classroom composition does have* influence on classroom behavior. This could be based solely on the criterion score levels of the five 20 percent intervals of non-white pupil classroom composition, but additional findings revealed that this would be an over-simplification. Those findings demonstrated that the determination of what non-white pupil composition is best, cannot be based upon the classroom ratio of non-white to white alone; it must include a consideration of the ratio of non-white to white pupils at the school level. This can be illustrated in a number of ways; first, by the discrepancies of the overall mean difference scores for the schools of the typology. These differences are greater than those found across the five 20 percent intervals of non-white pupil classroom composition of the original straight tabulation. This strongly suggests that it does make a difference what school type a 20 percent interval occupies. The second indication was found when a comparison was made between the original straight tabulation and the scores across the five 20 percent intervals of the **Concentrated White** school type. In the original straight tabulation the 41-60 percent interval was the highest scoring. In the **Concentrated White** school type it was the 0-20 percent interval which was the highest scoring. And a third indication similar to the above, was found at the 81-100 percent interval. This interval does not score as low as the 61-80 percent in the original straight tabulation. It is, however, fourth from the top among the five 20 percent intervals. But this same interval in the **Concentrated Non-white** school type had a much higher score, a score which was the fourth highest scoring of all the intervals of all school types. In fact it surpassed all scores of the **Concentrated White** schools.

This did not diminish the influence of the independent variable, however. Its strength is best illustrated by examining the 61-80 percent interval scores found in the various school types. The three school types of **Mixed White, Concentrated Non-white,** and **Concentrated White** had overall mean difference scores that exceeded the mean difference score for the entire sample. Correspondingly, they each had high scoring 20 percent intervals of non-white pupil composition which corresponded to the 20 percent intervals having the highest concentration of observations for each school type. However, a fourth school type, **Mixed Non-white** had an overall mean difference score which, unlike the school types noted above, was below the overall mean difference score for the entire sample; yet it had a 20 percent interval of non-white pupil composition which had the second highest mean difference score of all intervals for all school types. The 61-80 percent interval is responsible. The findings revealed that the 61-80 percent interval in the original straight tabulation had the lowest score. **Mixed Non-white's** 41-60 percent interval score is surpassed only by **Mixed White's** 21-40 percent and 41-60 percent intervals. Yet the 61-80 percent interval for **Mixed Non-white** scores are very low; only slightly above the low overall score for this interval for the entire sample. This interval is directly in line with the concentration of observations of the **Mixed Non-white** type. Thus the strength of the 61-80 percent interval is evident. It is clearly responsible for the **Mixed Non-white** school type's low overall score.

The findings demonstrated that the other variables employed in the study did exert some influence at various points. Generally, in comparison with the independent variable and school typology, their influence was mild. Controlling for the school typology though, spread the observations so sparsely across the distribution that it restricted the results when controlling for the other variables independently and in various combinations. However, the trends established while controlling for *class size, grade level, teacher sex,* high scoring subjects, and high scoring styles of educational activity on the independent variable carried through when the independent variable was controlled for school typology as well.

If the concept of racial balance is to include the criterion of the quality of classroom behavior, then the findings of this study strongly suggest that two factors whould be considered:

- the percentage of non-white pupil classroom composition
- the proportion of non-white pupils in the school

Among the highest scoring schools, the high scoring interval's position corresponded to the position of the intervals having the highest proportion of observations which determined the type of school in which the interval was located. This suggests that the high scoring 20 percent interval of non-white pupil composition will likely be found at a percentage corresponding to the location of the highest concentration of observations in the school. Examination of high scoring intervals and the school type in which they appear supports this analysis. **Concentrated White** school has its high scoring interval at 0-20 percent, **Mixed White** at 21-40 percent and 41-60 percent intervals and **Concentrated Non-white** at the 81-100 percent interval. Though all three of these are high scoring it should be pointed out that the **Mixed White** is well above the other two. **Concentrated White** and **Concentrated Non-white** are very close with the latter a bit higher. Therefore, for the sample, the *most desirable racial balance* with respect to the criterion of quality classroom behavior as assessed by **Indicators of Quality** *is to be found in classrooms of 21-40% and 41-60% non-white pupil composition in the Mixed White type of school.*

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